TOPCON

INSTRUCTION MANUAL
ROTATING LASER **RL-H3CL**

Thank you for purchasing the TOPCON RL-H3CL Rotating Laser.
The RL-H3CL instrument has many unique features. For basic operation, rough level the instrument and press power switch. It will self-level, then emit a rotating laser beam.
For superior product performance, please read these instructions carefully and keep them in a convenient place for future reference.

GENERAL HANDLING PRECAUTIONS

Before starting work or operation, be sure to check that the instrument is functioning correctly with normal performance.
When storing the instrument for long period, remove the batteries.
Always make sure instrument is dry before putting it in the carrying case. Never store a damp instrument.

DISPLAY FOR SAFE USE

In order to ensure the safe use of this product, prevent any danger to the operator or others, or damage to property, important warnings are placed on the product and inserted in the instruction manual. We recommend that you become familiar with the meaning of these Warnings and Cautions before continuing.

Display	Meaning
⚠ WARNING	Ignoring or disregard of this display may lead to the danger of death or serious injury.
⚠ CAUTION	Ignoring or disregard of this display may lead to personal injury or physical damage.

•Injury refers to hurt, burn, electric shock, etc.
•Physical damage refers to extensive damage to equipment and structure or furnishings.

SAFETY CAUTIONS

⚠ WARNING

- ¥ There is a risk of fire, electric shock or physical harm if you attempt to disassemble or repair the instrument yourself.
  This is only to be carried out by TOPCON or an authorized dealer, only !
- ¥ May ignite explosively.
  Never use an instrument near flammable gas, liquid matter, and do not use in a coal mine.
- ¥ Cause eye injury or blindness.
  Do not stare into beam.
- ¥ Risk of fire or electric shock.
  Do not use a wet battery.
- ¥ Battery can cause explosion or injury.
  Do not dispose in fire or heat.
- ¥ The short circuit of a battery can cause a fire.
  Do not short circuit battery when storing it.

⚠ CAUTION

- Use of controls or adjustment or performance of procedures other than those specified herein may result in hazardous radiation exposure.
- Do not stand or sit on the carrying cases.
  It could overturn, causing injury.
- Do not use a damaged instrument case.
  It could accidentally open causing damage to the instrument or injury to people.
- Do not place yourself or a reflecting object in the path of the laser beam. If using the laser outside, avoid positioning it anywhere near eye level to avoid any possibility of it striking someone in the eye. If this should happen, visibility could be temporarily impaired, causing disorientation and possible accidental injury.
- Please note that the tips of tripod can be hazardous, be aware of this when setting up or carrying the tripod.
- Do not allow skin or clothing to come into contact with acid from the batteries, if this does occur then wash off with copious amounts of water and seek medical advice.
- Do not place instrument on unstable platform, surface or tripod.
  If using tripod, make sure instrument is securely attached.
- Risk of injury by falling down a tripod and an instrument.
  Always check that the screws of tripod are tightened.

STANDARD PACKAGE COMPONENTS

Upon opening, make sure that all the followings are included.

1 RL-H3CL Instrument 1set
2 LS-70B/70C* Laser Sensor 1set
3 Size "C" dry batteries (R14PU) . . . . . 4pc.
4 9 volt dry battery (6F22/S-006P) . . . . . 1pc.
5 Carrying case . . . . . 1pc.
6 Instruction manual . . . . . 1vol.
7 Model-6 Laser Sensor Holder . . . . . 1pc.

* LS-70B is included for some markets instead of LS-70C.

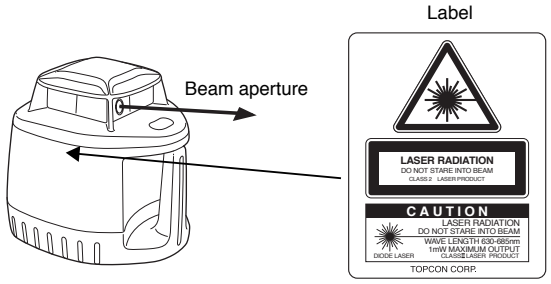
Exceptions from Responsibility

1 The user of this product is expected to follow all operating instructions and make periodic checks of the product's performance.
2 The manufacturer, or its representatives, assumes no responsibility for results of a faulty or intentional usage or misuse including any direct, indirect, consequential damage, and loss of profits.
3 The manufacturer, or its representatives, assumes no responsibility for consequential damage, and loss of profits by any disaster, (an earthquake, storms, floods etc.), fire, accident, or an act of a third party and/or a usage in other than usual conditions.
4 The manufacturer, or its representatives, assumes no responsibility for any damage, and loss of profits due to a change of data, loss of data, an interruption of business etc., caused by using the product or an unusable product.
5 The manufacturer, or its representatives, assumes no responsibility for any damage, and loss of profits caused by usage other than explained in the user manual.
6 The manufacturer, or its representatives, assumes no responsibility for damage caused by wrong movement, or action due to connecting with other products.

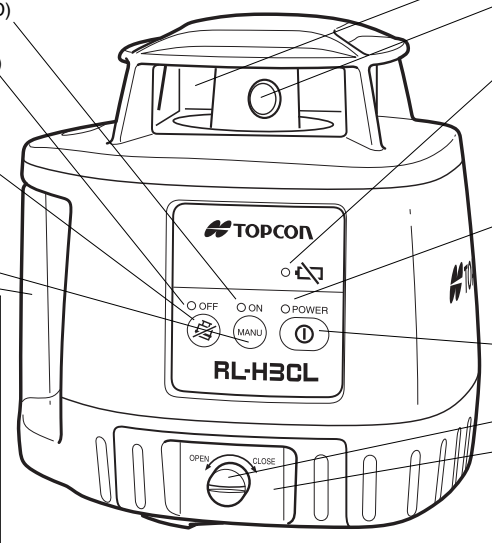
Laser Safety

This product uses a visible laser beam, and is manufactured and sold in accordance with "Performance Standards for Light-Emitting Products" (FDA/BRH 21 CFR 1040) or "Radiation Safety of Laser Products, Equipment Classification, Requirements and User's Guide" (IEC Publication 60825-1) provided on the safety standards for laser products.
As per the said standard, this product is classified as a "Class II Laser Product" or "Class 2 Laser Product".
This is a simple product to operate and does not require training from a laser safety officer.
In case of any failure, do not disassemble the instrument. Contact TOPCON or your TOPCON dealer.

Label



NOMENCLATURE AND FUNCTIONS



RL-H3CL

Manual mode ON (Red LED)
Auto leveling does not function.

Height alert OFF (Red LED)
Height alert does not function.

Height alert OFF switch
OFF:Push twice continuously.
ON:Push once.

Manual mode ON switch
ON:Push twice continuously.
OFF:Push once.

Handle

Height alert function
(Safety lock system)
When auto-leveling and height alert function are active, after the laser beam emits for one minute, this function prevents the instrument from operating if it is disturbed. This insures accurate control. If the unit is disturbed, all lamps will blink except battery power lamp. The elevation (height of instrument) should be verified and re-established if necessary. This function is not active in the manual mode.

Protective glass

Rotary head
Laser beam emits from here.

Battery power (Red LED)
`Blinking:`
The power is low, but laser is still usable. (Blinking continues for one minute.)
`On Solid:`
Dead batteries. Replace the batteries with new ones. (The lamp is solid for five minutes, then turned off automatically.)

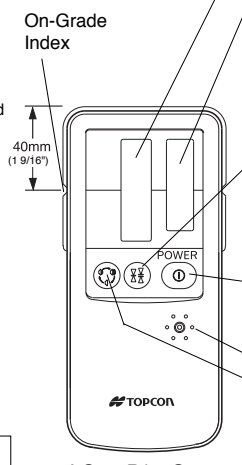
Auto leveling (Green LED)
`Blinking quickly:`
Auto leveling is in process.
`Blinking slowly:`
Auto leveling is almost complete.
`On Solid:`
Auto leveling is complete.

Power switch
Turn the instrument ON or OFF.

Battery door knob

Battery door

Note
In manual mode
•Auto-leveling function is not active.
•Height alert function is not active.



LS-70B/70C
(Laser Sensor)

Beam receiving window
Turn the beam receiving window side towards RL-H3CL to detect the laser beam.

Indicator
Detect the on-grade position "---" by moving the Laser Sensor up and down. Directional arrows and audio signals assist in locating the on-grade position as the laser strikes the beam receiving window. (Top of Laser Sensor is 40mm (1 9/16") from on-grade index for offset marking.)

LS-70B:The indicators are located on front and back sides of the instrument.
LS-70C:The indicator is located only on front side.

On-Grade precision switch
Two on-grade precision options are available, normal precision and high precision. By pressing this switch, the precision options are switched alternately. Confirm the precision choice by the indicator. (Normal precision is the default setting each time the sensor is turned on. See LS-70B/70C Indicator diagram below.)

Power switch
The power switch turns ON or OFF by pressing. If the power switch is turned ON, all signs will be displayed on the indicator for a second with a beep sound.

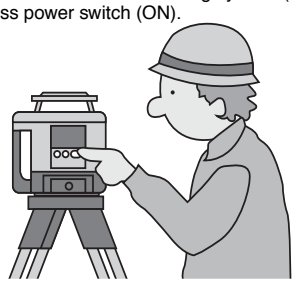
Buzzer speaker

Buzzer sound switch
Volume of the sensor buzzer can be alternately switched to LOW/LOUD/OFF by pressing the switch.

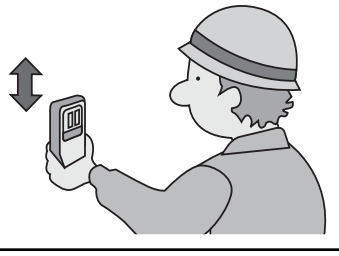
Auto shut off function
The power will be turned off automatically if no laser beam is detected for approximately 30 minutes. (To turn on the laser sensor, press the power switch again.)

HOW TO OPERATE

1 •Set the instrument to the tripod or smooth surface.
•Make sure instrument is roughly level (±3°).
•Press power switch (ON).

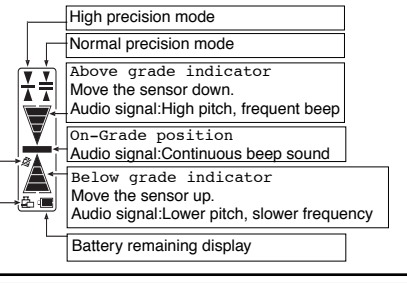


2 •Press power switch on laser sensor (ON).
•Select the precision mode by pressing the On-Grade precision switch.
•Locate the on-grade position "---" by moving the laser sensor up and down.

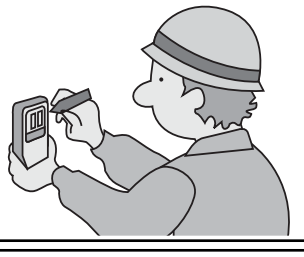


LS-70B/70C Indicator

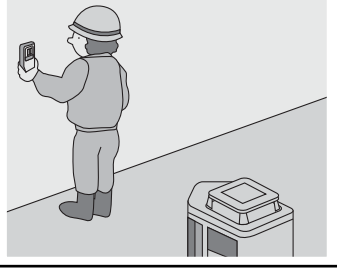
When using the Laser Sensor with other select Topcon lasers, these symbols alert user if laser batteries are low or if laser has been disturbed. These symbols are not active when used with RL-H3CL.



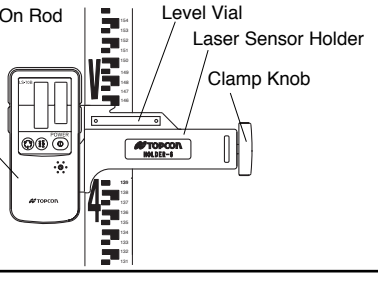
3 •Mark the position of On-Grade index.
(Top of the Laser Sensor is 40mm [1 9/16"] from index for offset marking.)

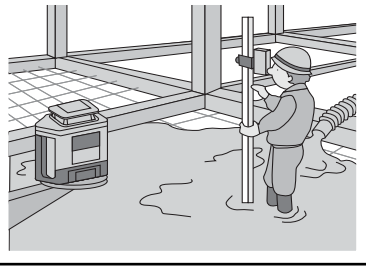


EXAMPLES OF TYPICAL USE



Using Laser Sensor On Rod



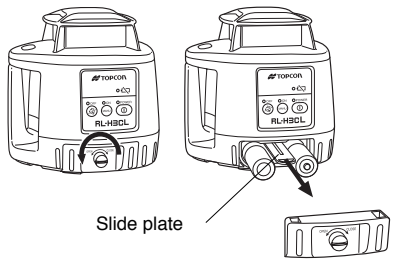


BATTERY REPLACEMENT

RL-H3CL

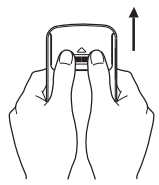
1 Remove the battery cover by turning battery cover knob to “OPEN” side.
2 Remove the batteries by pulling out the slide plate.
3 Install the new batteries referring to the illustration on the battery cover.*1, *2, *3
4 Install the battery cover. By using a coin, tighten the battery cover knob to “CLOSE” side until the knob does not turn.*4

*1 Replace all 4 batteries with new ones at the same time. Do not mix used and new batteries, and do not mix different types of batteries together.
*2 Use alkaline dry cells. (Dry cells for movement confirmation are packed in shipment.) Nickel hydrogen dry cells and nickel cadmium dry cells can be used too, but the operating time is different from the time of alkaline dry cells.
*3 Generally, performances of dry cell deteriorate temporarily in low temperature, but recover in normal temperature.
*4 It is important to use a coin or other tool to make sure cover is firmly closed to seal out water.



Laser Sensor

1 Press the lid in the direction of the arrow to lift.
2 Remove the battery and replace with a new 9v alkaline battery.
3 Press the lid down and click to close.



CHECKS AND ADJUSTMENTS

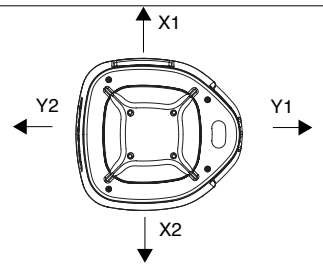
1 Checking and adjusting calibration

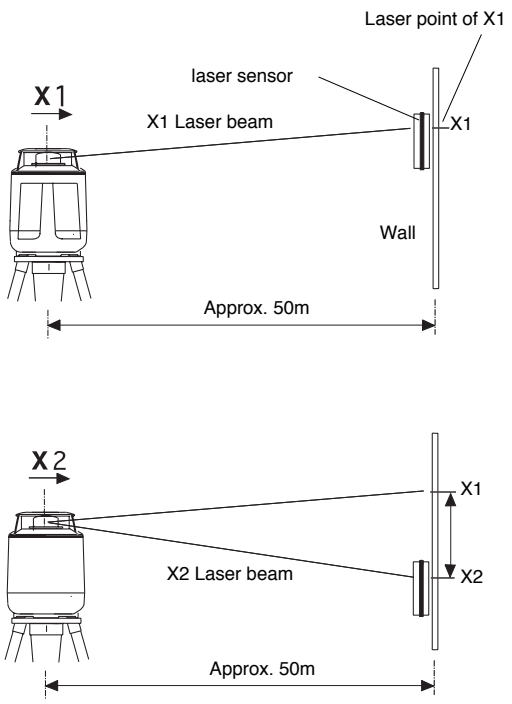
Horizontal calibration of the laser beam can be checked by the user.

[Checking]

1 Set up a tripod approx. 50m (160ft) from a wall. Mount the instrument on the tripod, facing the X1 side toward the wall.
2 Turn the instrument on and allow auto-leveling to complete.
3 Put the laser sensor in fine detection mode by pressing the On-Grade precision switch.
4 By using the laser sensor, mark the center position of laser beam on the wall. (X1)
5 Turn off the instrument.
Loosen the tripod screw, rotate the instrument 180 degrees and re-secure it on the tripod. The X2 side of the instrument faces toward the wall.
When rotating the instrument, avoid changing the height.
6 Turn the unit on again and allow auto-leveling to complete.
7 By using the laser sensor, mark the center position of laser beam on the wall. (X2)
8 If the difference value of marked two laser beam heights (difference value of X1 and X2) are less than 5mm, adjustments are not needed. The difference value is greater than 5mm, adjust the instrument as described in right. *
9 Check the X1 (handle) side as the same way.

*If the difference value is greater than 60mm (2 3/8 inches), contact your Topcon dealer.





[To calibrate the X axis]

1 Face the X1 side of the instrument (panel side) toward a wall, press the Power switch while pressing the height alert OFF switch.
Then the height alert OFF lamp will light, and manual mode ON lamp will blink.
2 Press the height alert OFF switch to calibrate the X axis. The manual mode ON lamp will light. When auto-leveling finishes, the laser beam will emit.
3 Using the laser sensor, mark the on-grade height of laser beam on a wall.
4 Rotate the instrument 180 degrees to face X2 side toward a wall.
5 In the same way as step 3 , mark the on-grade height of laser beam on a wall.
6 By pressing the manual mode ON switch (laser beam moves up), or Power switch (laser beam moves down), adjust the on-grade height of the beam until it is precisely centered between the marks made in steps 3 and 5 .
7 Press the height alert OFF switch to memorize the new laser beam calibration. The height alert OFF lamp will blink. Power will shut off automatically when the calibration memorization is complete.

[To calibrate the Y axis]

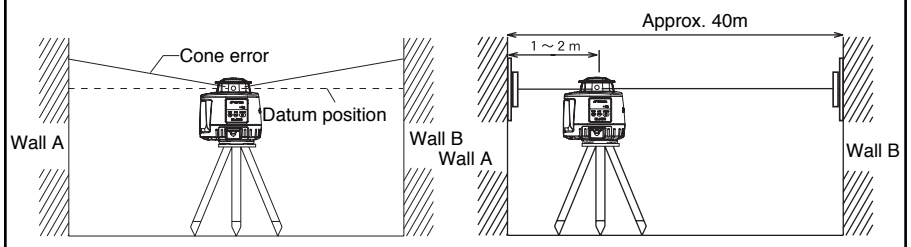
1 Face the Y1 side of the instrument (handle side) toward a wall, press the Power switch while pressing the height alert OFF switch.
Then the height alert OFF lamp will light, and manual mode ON lamp will blink.
2 Press the Power switch again. The auto leveling lamp will light.
3 Press the height alert OFF switch to calibrate the Y axis. The auto leveling lamp will light.
4 Using the laser sensor, mark the on-grade height of laser beam on a wall.
5 Rotate the instrument 180 degrees to face Y2 side toward a wall.
6 In the same way as step 4 , mark the on-grade height of laser beam on a wall.
7 By pressing the manual mode ON switch (laser beam moves up), or Power switch (laser beam moves down), adjust the on-grade height of the beam until it is precisely centered between the marks made in steps 4 and 6.
8 Press the height alert OFF switch to memorize the new laser beam calibration. The height alert OFF lamp will blink. Power will shut off automatically when the calibration memorization is complete.

To discontinue calibration the instrument, press the Power switch while pressing the height alert OFF switch.

When calibration is memorizing, if the height alert lamp continues to blink quickly and power does not shut-off automatically, please contact your local Topcon dealer.

2 Checking cone error

Perform the following check after completing horizontal calibration procedure.



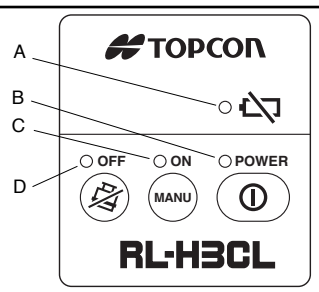
[Checking]

1 Set up the laser centered between two walls approximately 40m (131ft) apart. Orient the instrument so one axis, either X or Y, is facing the walls.
2 Locate and mark the position of the rotating laser beam on both walls using the laser sensor.
3 Turn off the instrument and move the instrument closer to wall A (1m to 2m /3 ft to 6 ft). Do not change the axis orientation of the instrument. Turn the instrument on.
4 Again locate and mark the position of the rotating laser beam on both walls using the laser sensor.
5 Measure the distance between the first and second marks on each wall.
If the difference between each set of marks is less than 4mm (5/32 of an inch), no error exists.

*If the difference value is greater than 4mm(5/32 inch), contact your Topcon dealer.

3 Error Code

Use the table below to determine operation errors indicated by blinking lamps on the control panel. If corrective action listed does not correct error, please contact your local Topcon dealer.



Lamp Indication	Error Code	Corrective Action
Lamp B, C and D blink in turn	Auto-leveling range error	Correct tilt of the instrument until it less than 3 degrees.
Lamp A lights	Battery power error	Replace all 4 batteries with new ones at the same time.
Lamp B, C and D blink simultaneously	Height alert error	Turn power off, rough level the instrument, then turn power on again. Check height of laser beam as it may have changed.
Lamp D blinks quickly	Calibration error	Repeat calibration procedure. If error repeats contact your local Topcon dealer.
Lamp A, B, C and D blink simultaneously	Internal error	Turn power off, then on again. If error repeats contact your local Topcon dealer.

STORAGE PRECAUTIONS

Always clean the instrument after use.
Use a clean cloth moistened with neutral detergent or water.
Never use an abrasive cleaner, ether, thinner benzene, or other solvents.
Always make sure the instrument is completely dry before storing. Dry any moisture with a soft, clean cloth.

SPECIFICATIONS

RL-H3CL

Accuracy	:	±2.4mm/50m (±10 ”)
Automatic correction range	:	±3°
Beam detecting range	:	Approx. 2m~500m diameter (6ft~1640ft)
Rotational speeds	:	600r.p.m
Laser source	:	Laser diode (Visible, Red)
Laser power output	:	0.9mW (Max.)
Laser class	:	Class 2 laser product
Power supply	:	Four C size alkaline manganese dry batteries
Operating time	:	Approx. 60 hours at +20°C (+68°F)
Protection against water and dust	:	IP56 (Based on the standard IEC60529)
Operating temperature	:	-20°C~+50°C (-4°F~+122°F)
Dimensions	:	167(L)x182(W)x189(H)mm (6.5x7.1x7.4 in)
Weight	:	1.9kg[4.1lbs] (With dry batteries)

LS-70B/70C

Beam detection window	:	50mm (2.0 in)
Beam detection precision	:	High precision : ±1mm(±0.04 in)
		Normal precision : ±2mm(±0.08 in)
Beam detection indication	:	Liquid crystal and buzzer
Power source	:	DC 9V alkaline (dry) battery
Operating time	:	Approx. 80 hours at +20°C (+68°F) (Using alkaline manganese dry batteries)
Auto shut-off delay	:	Approx. 30 minutes without beam detection.
Operating temperature	:	-20°C~+50°C (-4°F~+122°F)
Dimensions	:	165(L)x78(W)x26(H)mm (6.5x3.0x1.0 in)
Weight	:	0.25 kg [0.55 lbs] (With dry batteries)

N 13813 CE Japan Surveying Instruments JSIMA Manufacturers' Association

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